THE COVER

Probing The Unseen

Feeling like Gulliver in this Lilliputian world known only to mortals with microscopes, we must stare with awe at the marvels of nature. What you see on this page and also on the cover of this issue represents man's ability to penetrate the unseen.

These are spores and mycelium of *Helminthosporium sativum*. They were trapped in this photomicrograph taken by Dr. Houston B. Couch, professor and head of the department of plant pathology and physiology, Virginia Tech. Technically this disease of turf is also known as *Helminthosporium sorokinianum*. But commercial turfgrass managers know it better as leafspot.

This particular strain is perhaps the most destructive of the many Helminth strains. It most commonly affects Kentucky bluegrass, annual bluegrass, creeping bentgrass and creeping red fescues. It should not be confused with melting out, a characteristic identified by *Helminthosporium vagans*. Rather, leafspot actually blights the lamina (extended parts of the leaf). This causes a sudden collapse and drying of the leaf blade, after which the leaves blanch to a light straw color.

How fast does this occur. The photo you see here contains only a few isolated spores. In turf, millions of those spores can germinate within a very short time. During warm, humid weather, leaf blighting may occur with four or five days from the time of initial infection. It's been reported that leafspot is temperature related. The higher the temperature the greater the damage resulting from the disease.

Leafspot survives the winter as dormant mycelium (the chainlike structures in the photo) in infected plants and infested debris such as thatch. It initially develops on this dead tissue, but can just as easily develop on dead tissue of growing plants. According to Dr. Couch, on Kentucky bluegrass leaves, spores germinate in 30 to 40 minutes from the onset of optimum environmental conditions.

Carbohydrate levels as a factor of plant nutrition are not of importance in determining the proneness of Kentucky bluegrass to Helminthosporium leafspot. Tests have shown that the susceptibility of Kentucky bluegrass to leafspot increases with increasing rates of nitrogen fertilization.

How can you control leafspot? Cultural practices including fertilization and mowing should be practiced. Seed varieties exhibiting some resistance to leafspot have been developed; more will be coming. Fungicides are available to effectively control the spread of the disease. Among the many are: Dyrene, Daconil, Thiram, Zineb, Tersan LSR, Acti-Dione, and others.

Disease Control Planning Is Needed

On many golf courses disease control was a relatively simple business until irrigated fairways and the new systemic fungicides came along. Since then life has become more complicated every year.

In the good old days of dry fairways, drought damage overshadowed disease problems, thus, the greens and sometimes tees were a superintendent's only worry.

Irrigated fairways created 30-40 acres of potential "sick grass." A single fungicide application to fairways may involve an investment from $500 to as high as $6,000.

The older metallic fungicides such as the mercury to cadmium materials and even organic protectants such as

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thiram, maneb, zineb, Dynene, Actidone and Daconil have broad activity spectra. Even though they were more effective against some pathogens then others, the materials still were toxic to a wide range of disease organisms. Neither fungicide choice nor disease diagnosis was critical. If the superintendent mis-diagnosed his fungicide choice it was still more or less effective and nothing drastic happened.

The advent of the new systemics changed all that. The benzimidazole (Tersan 1991) compounds are extremely effective against *Sclerotinia* dollarspot and worthless against *Pithium* blight. Attempting control of *Pithium* blight mis-diagnosed as dollarspot with lots of visible white mycelium would be pure disaster.

These or similar types of crises happened far too often this past summer. In one instance with which we were familiar, greens received four applications of different fungicides in one week, all at maximum label dosage. At the end of the week, the greens were yellow, partially scorched and diagnosis of the original problem would have taken the wisdom of 16 Solomons. The cure was indeed worse than the ailment.

Successful disease control is built on good planning and taking advantage of accumulated experience. Cultural mangement comes first, chemical fungicides second. For greens especially, a good, deep, vigorous root system is essential. Disease damage to a bentgrass green surviving on ¼ inch of root depth clinging to bricklike compacted soil will be far worse than on a deep rooted healthy turf. Far too many people are substituting the chemical pill for spring and fall aerification, monthly topdressing, and light verticutting at regular intervals. Topdressing plays a big roll in decaying surface debris and thatch; thus, minimizing the survival base for disease organisms.

Various fungicide programs can be used to accomplish the same goal. Experience plays a big part in fungicide choice and successful use. New fungicides should be introduced gradually, first in the nursery, then on a green or fairway, and finally incorporated into the total program. This may take an entire season or several seasons to accomplish.

There are no miracle fungicides. Often what is gained towards one disease is lost in another. The replacement of mercury with benzimidazoles (systemics) in a fungicide program gains better dollarspot and brown patch control but loses all *Helminthosporium* and *Pythium* suppression, thus requiring additional different fungicides integrated at appropriate intervals.

Last, successful control requires accurate disease diagnosis and estimation of problem severity. Is the disease truly going to result in severe turf loss or is it merely a curiosity? Will it get better in a week whether you spray or not? With rising costs everywhere the turf manager must make hard decisions. Treatment costs must be viewed in terms of real benefits, not imagined or whimsical improvement.

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Fine Fescues Right For Roadside Uses

Fine fescues are important components of grass mixtures to use for keeping roadsides green and beautiful with a minimum of maintenance, according to Dr. Robert W. Duell of Rutgers University.

"Research has shown that several of the fine fescues thrive in acid soils, such as are frequently found along roadsides where there is less opportunity to correct soil acidity with applications of lime," he said.

An associate research professor in the department of soils and crops at Cook College, New Brunswick, N.J., Dr. Duell reported the result of his research on turfgrass varieties and soil acidity to the American Society of Agronomy.

The field work involved the development of different levels of acidity in field plots through 4 years of surface applications of ammonium nitrate and lime.

Once the desired acid levels were reached, 19 varieties of grasses and legumes were sown in the plots. All plants tested, except the fine fescues, did best in the less acid soils that had had lime treatments. The fine fescues, however, did better in the more acid soils of the research area.

In addition to the paper, Dr. Duell is senior author of a monograph and slide series, sponsored by the Turfgrass Division of the ASA, which he previewed at the meeting. The slides portray the problems, materials, and methods involved in the development of a superior vegetative cover for roadsides and will be available through the ASA.